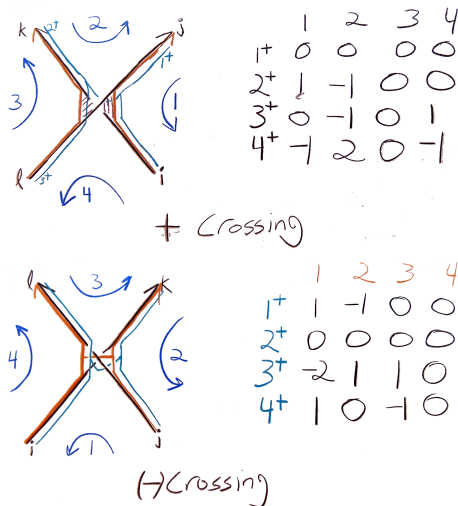


Once[<< KnotTheory`]

Loading KnotTheory` version  
 of February 2, 2020, 10:53:45.2097.  
 Read more at <http://katlas.org/wiki/KnotTheory>.

```
MatrixSignature[A_] :=
  Total[
    Sign[Select[Eigenvalues[A], Abs[#] > 10-12 &]]];
Writhe[K_] := Sum[If[PositiveQ[x], 1, -1],
  {x, List@@PD@K}];
```



The Bedlewo program

```
Bed[K_, ω_] :=
  Module[{t, r, XingsByArmpits, bends, faces, p, A, is},
    t = 1 - ω; r = t + t*;
    XingsByArmpits =
      List@@PD[K] /. x : X[i_, j_, k_, l_] =>
        If[PositiveQ[x], X+[-i, j, k, -l], X-[-j, k, l, -i]];
    bends = Times@@XingsByArmpits /.
      _[X][a_, b_, c_, d_] => pa,-d pb,-a pc,-b pd,-c;
    faces = bends /. px-,y py-,z => px,y,z;
    A = Table[0, Length@faces, Length@faces];
    Do[is = Position[faces, #][[1, 1]] & /@ List@@x;
      A[[is, is]] += If[Head[x] === X+,
        
$$\begin{pmatrix} -r & -t & 2t & t^* \\ -t^* & 0 & t^* & 0 \\ 2t^* & t & -r & -t^* \\ t & 0 & -t & 0 \end{pmatrix}, \begin{pmatrix} r & -t & -2t^* & t^* \\ -t^* & 0 & t^* & 0 \\ -2t & t & r & -t^* \\ t & 0 & -t & 0 \end{pmatrix},$$

        {x, XingsByArmpits}];
    MatrixSignature[A];
```

The Kashaev Program

```
Kas[K_, ω_] :=
  Module[{u, v, XingsByArmpits, bends, faces, p, A, is},
    u = Re[ω1/2]; v = Re[ω];
    XingsByArmpits =
      List@@PD[K] /. x : X[i_, j_, k_, l_] =>
        If[PositiveQ[x], X+[-i, j, k, -l], X-[-j, k, l, -i]];
    bends = Times@@XingsByArmpits /.
      _[X][a_, b_, c_, d_] => pa,-d pb,-a pc,-b pd,-c;
    faces = bends /. px-,y py-,z => px,y,z;
    A = Table[0, Length@faces, Length@faces];
    Do[is = Position[faces, #][[1, 1]] & /@ List@@x;
      A[[is, is]] += If[Head[x] === X+,
        
$$\begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix}, - \begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix},$$

        {x, XingsByArmpits}];
    (MatrixSignature[A] - Writhe[K]) / 2];
```

Comparisons

```
Sum[ω = ei RandomReal[{0, 2π}]; Bed[K, ω] == Kas[K, ω],
  {10}, {K, AllKnots[{3, 10}]}]
2490 True
```